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EP-1: What if our Sun became a Black Dwarf?



What if Our Sun Became a Black Dwarf?

Episode-1

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Season 1, Episode 1 of

[Astrophysics: Deep In The Space
With Maanvinder Pania](#)

Topic- All about black dwarf & what
if our sun became a black dwarf

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What If Our Sun Became A Black Dwarf?

A black dwarf is a hypothetical star in our universe that do not exists now but will exist in future after a white dwarf star will cooled down. Black dwarfs takes quadrillions of years to form. At less than 14 billion years old, the universe is too young to have any existing black dwarf.

Formation

A black dwarf is made when a white dwarf star becomes too cold & cannot make large amounts of heat and light. Thus, the star will get darker and darker and become a black dwarf. The whole process of a star to become a black dwarf takes long time. According to astronomer Ethan Siegel, a white dwarf will take at least a hundred million billion years to cool down and become a black dwarf. As it emits no heat radiation, it is nearly impossible to see them. However, the Black dwarfs would not lose its mass, which will allow scientists to detect the effects produced by its gravitational field.

What if our sun became a black dwarf?

Our sun is a main-sequence star which means it is a yellow star that has a 1 solar mass (1 solar mass= mass of our sun). A main-sequence star lacks the mass necessary to explode into supernova to become a black hole or a neutron star. Instead, it will become a white dwarf, which is a kind of dead star that has burned through all of its fuel, meaning it's no longer capable of continuing the fusion of hydrogen into helium that makes a star to glow and

produce heat. In about 8 billion years our sun will become a white dwarf & over trillions of years it will no longer emit any light.



White Dwarf will slowly cool down and become Black Dwarf.

But the white dwarf will remain hot for other trillions of years. After, long time all the heat will radiated away & our sun will become a black dwarf. The estimated time for our sun to cool enough to become a black dwarf is 10^{15} (1 quadrillion) years. It will have an impact on Earth; After the first week without the Sun's heat, the [Earth's surface temperature](#) would drop to 0°C (32°F). After a year, it would go down even more - dropping to a freezing cold -100°C (-150°F). By that time, all our oceans would be covered in ice. Despite that, the only warm place on the planet that you'd have even a slight chance for

survival would be near the Earth's geothermal vents at the bottom of one of these oceans.

Thanks for reading!!!

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